

## Theme 6. Rescue of stranded persons

### C18. Rescue of stranded passengers in the Arctic

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#### C.18.1 Introduction

Since we (the authors) could not be a part of the whole SARex 3 exercise this year, we joined the expedition later than the rest of the participants. We gladly accepted the invitation from the Governor of Svalbard, Kjerstin Askholt, and her staff in Longyearbyen to join their service vessel, MS Polarsyssel, to meet The Norwegian Coast Guard's vessel, (NOCGV) Svalbard, at the location where the last part of the SARex expedition would take place. MS Polarsyssel and the Governor of Svalbard's staff would this year participate in this last part of the SARex 3 exercise with the aim to prepare and handle the situation of a large number of stranded passengers in the Arctic. In this part of SARex 3 exercise, the rescue group from Longyearbyen Red Cross would also participate and practice in this search and rescue (SAR) exercise; see [1]. The governor of Svalbard is both the chief of police and accorded the same authority as a county governor on the mainland. Rescue service is one of the governor's tasks, and the governor normally leads all rescue missions in Svalbard. The Joint Rescue Coordination Center (JRCC) North in Bodø has the overall operational responsibility during search and rescue operations north of 65 degrees north. The operations are coordinated either directly from JRCC North or through the Governor of Svalbard. For more information concerning this, see [2].

This report will focus on the search and rescue (SAR) exercise from the point of view of the "late arrivers" (as we were called throughout the rest of the SARex 3 expedition).

#### C.18.2 "Thinking" Svalbard and cold climate

Even though the authors live in the northern part of Norway, north of the Polar Circle, we soon noticed that living and staying on Svalbard is very different compared to living on the "Arctic" mainland. Examples

- the importance of distinguishing between indoor and outdoor shoes;
- the different ways of giving a "thumbs up" or an "ok sign", where you for instance put the whole hand on the head/helmet instead (since large gloves on the hands make it difficult for the thumbs to be seen);
- the fact that preparedness includes always having the gasoline tank of your snow mobile filled up and always bringing polar bear protection with you;
- the long distances at sea from the mainland and around Svalbard that make rescue operations extremely difficult – emphasize the difference.



*Figure C.18.1. At Longyearbyen, we were introduced to snow mobiles very early. Photo: Annette Meidell.*

Also, bearing in mind that, in the hospital in Longyearbyen, the number of employees and the amount of space and equipment are limited, the volunteers in Longyearbyen Red Cross, are important and play a great role in rescue operations regarding accidents in and around Svalbard.

In order to stay safe in Svalbard, the governor of Svalbard, in cooperation with Visit Svalbard, The University Centre in Svalbard (UNIS), Norwegian Polar Institute and Longyearbyen Red Cross, has published a brochure on safety in the field in Svalbard; see [3]. The brochure focuses on safety in the field for visitors who choose to go hiking in Svalbard. Nevertheless, there is a lot of important information that also applies to “stranded passengers” or tourists experiencing unwanted accidents in the Arctic Sea “nearby” Svalbard. Some of the equipment that they suggest that all hikers should take with them when hiking in Svalbard should also be available to potentially “stranded passengers”. For instance, they clearly state that it is necessary to always take warning aids, intimidation aids (pyrotechnical aids) and weapons for polar bear protection, and they also suggest different equipment and means of communication necessary to be able to report accidents. It is also suggested that the shoes and clothing you wear should be large enough to fit in extra insulating layers (if you get into an evacuation situation).

In [4], information will be found on how to operate ships in the Arctic and nearby Svalbard. In the folder, “Information for non-residents in Svalbard” in [5], more information may be found concerning, for instance, that one must be aware of glaciers that may calve icebergs, the low sea temperature, unsafe sea ice and the fact that extreme weather conditions can occur very rapidly.

All the information presented above gives the feeling that it is important to visit and stay in Svalbard with a kind of special focus of “thinking” Svalbard and the cold climate, when enjoying a stay there.



*Figure C.18.2. The view from KV Svalbard at Fjortende Julibukta north of Ny-Ålesund was beautiful, but one must also be aware of the glacier that might calve icebergs. Photo Annette Meidell.*

With all this in mind, the settings and limits for a SAR exercise in connection with Svalbard appears somewhat different from at sea near to the mainland, and especially compared to SAR activity in warmer regions. With the large distances between the mainland and Svalbard and the enormous cold sea area with possibly extreme weather conditions, the importance of training and competence transfer

in SAR is extremely important.

### C.18.3 Joining MS Polarsyssel for preparation

Finally, after a very pleasant meeting with the governor of Svalbard and some of her staff, we were kindly escorted to MS Polarsyssel, where we were given a great guided tour.



*Figure C.18.3. On our way to MS Polarsyssel at Kullkaia in Longyearbyen. Photo: Annette Meidell.*

We also met the 16 members from the Longyearbyen Red Cross (LRKH), who would participate in SARex 3 and also use MS Polarsyssel as a training and preparation area during the whole weekend, and as a field hospital during the SARex exercise.

The time taken to sail to the place where the exercise would take place was devoted to training and preparation for the exercise the next day. Both staff from the governor of Svalbard and professional medical staff from the hospital in Longyearbyen participated and helped to prepare the participants for the next day's exercise. The Red Cross members were given important lectures and information by the Governor of Svalbard's staff and Deputy Commander Steve Olsen in the Coast Guard, concerning different accidents and rescue operations in the Arctic, and guidance and support by medical personnel from the hospital in Longyearbyen. In addition, internal Red Cross guidance in rescue operations was provided. LRKH members were given a lecture on how to use the priority method "triaging" to determine the severity of the condition of patients. They also planned the area of scenes that the patients should be put into, according to the priority areas. The discussions afterwards were also very important. The focus on rescuing in the Arctic Sea requires different handling than rescue operations in the mountains or mainland, especially when it comes to the rescue of large numbers of stranded people, which was the theme for this exercise.

The boundaries for the use of MS Polarsyssel as a field hospital were set in advance: I.e. only, a few of the cabins should be used as a "hospital" and MS Polarsyssel's crew should be "invisible". The strain for the members of the Red Cross should be minimized during the exercise; hence, as little lifting and carrying as possible should be performed. This exercise would give the Longyearbyen Red Cross members training in e.g. logistics, learning how to take control of the scene and to practice the triage of patients, in order to determine the priority of the treatment of wounded people, based on the extent of their condition: a kind of "wounded priority" exercise.



The Longyearbyen Red Cross (LRKH) members did not know what to expect at the scene of the exercise, how many people were participating in the exercise as casualties (markers), or what condition they would be in. Since everything at the scene was unknown, they prepared for several scenarios, regarding wounds, conditions, need for treatment and equipment, etc. The different scenarios would lead to different rescue operations and treatments.



Figure C.18.4. Some of the Longyearbyen Red Cross members waiting to start the exercise. Photo: Steve Olsen.

The leadership of such a rescue operation is a very important part of the Red Cross operation. The success rate of the rescue operation will largely depend on good organization of the scene, such that the handling and treatment of patients will be successful. Therefore, it was of great importance that several Red Cross members also had the opportunity to practice this part of the exercise. Thus, the “discovery” of the stranded passengers and organization of the area was repeated several times, using different “leaders” from the Red Cross each time.

### The discovery of the stranded passengers

What the Longyearbyen Red Cross did know was that the exercise would start the following morning. After a good meal and a good night’s sleep aboard MS Polarsysssel, early the next morning, on an island in the Fjortende Julbukta north of Ny-Ålesund, we found the “stranded passengers”.

Dressed in their suits, with their personal “first aid backpack” and other equipment at their side, the Red Cross members were ready to start the exercise. The “stranded passengers” were, of course, the other participants in the SARex 3 exercise, as well as some of the crew of KV Svalbard; in total, over 40 people acted as “stranded tourists”. The “stranded tourists” had been given different “conditions” as patients and acted accordingly. Some of them had been exposed to “fire and explosions”, some had “heart problems”, some had trauma, while others were suffering from hypothermia, etc. Although 40 is not a large number, an exercise with this number of “stranded people” will, at least, identify some issues that must be taken into consideration for even larger rescue operations.



Figure C.18.5. The scene of the “accident”. Photo: Annette Meidell.

The members from the Longyearbyen Red Cross very soon and professionally started their work. Since they had planned that several of their members would have the opportunity to “lead” the rescue exercise, they repeated the start of the exercise several times and discussed what strategies would be best during the exercise.

Since the LRKH members had discussed the different scenarios for how the area should be used, the patients were put into different places according to the priority areas that had been decided. They practiced the triage method at the “accident” scene and at MS Polarsyssel for a large number of different conditions. At the scene of the “accident”, the “patients” were registered, briefly examined and given labels with the priority of their condition. Since this exercise was mainly a maritime Arctic “area” and “method” exercise, on this occasion lower priority was given to whether the patients received the correct diagnosis or not. Diagnosis/priority practice can easily be provided regularly at the Red Cross “home” base, since there are continually many new members that require this.

We were impressed by the training and effort that the Red Cross displayed, and they informed us that they had not previously practiced such an operation from an Arctic maritime point of view and found it very important. They were grateful to have been given the opportunity to be a part of the SARex 3 exercise, together with the Governor of Svalbard, Kjerstin Askholt, and her staff at Longyearbyen; see [1], in which the exercise is described in detail from their perspective.

### The logistics

Logistics are of great importance to achieve a successful rescue operation in the Arctic Sea. Since you may only reach the accident area by boat, or by helicopter (if the distance is not too far from the service station to get fuel), you also must consider whom to bring to the area first, as well as what equipment to bring, based on what casualties there might be. It is not possible to bring all the first aiders, emergency medical technicians and equipment required for the situation at once. In addition, the logistics are of importance when it comes to which of the wounded people to treat first and how to treat them. Both MOB (man over board) boats and helicopters have only a limited space to hold and transport wounded people. The transfer of wounded people from an island or beach (as was the case in this exercise) to the “field hospital” at MS Polarsyssel requires intermediate transport from the island, via a MOB boat and then to MS Polarsyssel and then, perhaps, to the hospital in Longyearbyen.



*Figure C.18.6. The MOB boat transporting equipment and rescuing people to the island and bringing wounded people to the “field hospital”, MS Polarsyssel. Photo: Annette Meidell.*

Since the MOB boat used in the exercise also has restricted space, only a limited amount of equipment and number of people could be transported to and from MS Polarsyssel during the time at which the exercise was used as a field hospital.



Figure C.18.7. The MOB boat loaded with wounded people. Photo: Annette Meidell.

Choosing which first-aiders, medical personnel and patients should be transported to and from the accident scene is of huge importance, and skills in deciding this, in the different scenarios of an accident in the Arctic Sea, are very important.

### Innovation and equipment

In this operation, it is not only the logistics and priority questions that are of importance; as we witnessed, the technical equipment for handling wounded people clearly has the potential for development. The processes of bringing cold, wet and wounded people across bumpy land by carrying and sliding, and of lifting to maneuver those who were attached to stretchers at all different angles to enter and fit into the MOB boat, are neither easy nor comfortable. The operation to get the wounded people from the beach to the MOB boat identified some difficulties; since this procedure included lifting people and stretchers relatively high, there was also a risk of dropping the wounded people onto the floor, into the water or onto the ground. In addition, the effort involved for the rescuers could lead to different injuries (back pain, shoulder pain, etc.).



Figure C.18.8. The transfer of wounded people onto the MOB boat is difficult. Photo: Annette Meidell.

This rescue operation clearly identified the need for different designs or new products that can help in rescue situations. By observing the rescue exercise and following the operation closely, we observed that a systematic procedure for registering findings should be generated. This would also include suggestions for how to follow up the findings, in order to close the gap between findings and necessary solutions. To further develop the necessary equipment, it is important to publish such registered “findings”, and anyone should be able to make inputs to such a “findings list”. The “findings list” should be available to the public, so that anyone can solve the problems that are published therein. The “public” challenges and unsolved questions should be open and published at e.g. Maritimt Forum Nord (MFN)’s home page, so that companies, students, researchers or other interested parties can work on these challenges. Next, there should be systematic cooperation with, for instance, innovative R&D (Research and development) institutions (e.g. universities) that can use “findings” as projects for students or researchers, in order to design or redesign such “non-commercial”, new or improved helpful aids for use in such Arctic maritime environments.



Figure C.18.9. The MOB boat from KV Svalbard also helped to transport people to and from the scene of the "accident".  
Photo: Annette Meidell.

MS Polarsyssel can lift stretchers from sea level and up onto the boat. The next challenge was to handle the wounded people inside MS Polarsyssel. The Longyearbyen Red Cross found that handling stretchers with wounded people inside the service vessel was neither easy nor comfortable.



Figure C.18.10. The Longyearbyen Red Cross members maneuvering a patient on a stretcher on board the field hospital. Photo by courtesy of LRKH.

For instance, we identified that improvements in the shape of a lightweight stretcher system with flexible and multi-task properties will be welcome.

We also think that new technologies such as different apps for mobile phones (and other electronic network devices) that could easily give and exchange information across institutions involved in the operation are welcome as helpful aids in SAR operations. The Longyearbyen Red Cross tested such a system in the exercise, and their experience in this will be important for further developments. In addition, different robust drone systems and communication systems in these areas where there is limited ordinary network connections could give important information and be helpful in such SAR operations.

### Tide and weather conditions

Although we were lucky, having fair weather conditions during our SARex exercise, with temperatures of approximately 4°C in both water and air, we would have suffered from hypothermia, without good protection (clothes, tents, etc.). We saw that the “stranded passengers” felt cold, even though they were not in a “real” evacuation situation and were not even wet. They were happy to be offered something

hot to drink. The worst “wounded” passengers were put to rest in a nice hot tent, where they were protected from the wind, snow and rain. Of course, there was not space in the tents for everybody, but clearly this kind of protection would make a big difference to the condition of the patients. Such protective shelters with heaters and other equipment must be brought to the scene of the accident, and, due to transport and logistics to and from the area, it may be difficult to obtain all the shelters and equipment needed or desired. New types of lightweight shelters and other equipment, as well as new, better insulating products/materials, may be helpful in these situations. Also, in real situations, the weather conditions may, of course, be much more extreme than we experienced, with wind, snow, rain and waves, in addition to much lower air temperatures. In such conditions, it will be important to have the possibility to keep warm.



*Figure C.18.11. A hot tent is a good place to be. Photo: Annette Meidell.*

### Be aware of the tide

In addition to always being prepared for the possible rapid oscillating and extreme weather conditions, there is also the issue of the tide. The tidal range, which describes the vertical difference between the high tide and the following low tide, in the northern part of Norway and Svalbard must be taken into consideration when rescuing persons that e.g. are stranded on shore. The tidal range can fluctuate by as much as approximately 2.5 m in the northern part of Norway and 2.0 m in Svalbard; see for instance [6] and [7]. In SARex 3, we observed these fluctuations in detail. In particular, the MOB boat could not approach the same place on the beach during the whole period of the exercise. Thus, the place where the MOB boat should have approached the stranded passengers to transport them to MS Polarsyssel had to be varied for some hours. Sometimes a ladder could be used to enter and leave the MOB boat when the water was low, since the level from the shore to the boat was higher, but sometimes it was necessary to change the place where the boat had to anchor; hence, the patients also had to be moved to the new place.



Figure

*C.18.12. At this time, a ladder had to be used in order to transfer people onto and out of the MOB boat at a different sea level. Photo: Steve Olsen.*

It was very interesting to observe the rescue operation, and we noticed some things that may be improved and make the operation smoother and less stressful for both rescue personnel and patients. Clearly, however, we did not notice everything, so obviously there are other areas that could also be improved.

Both members from the Red Cross and other participants in SARex 3 experienced the need for the redesign and development of different equipment, and we think that an even more systematic registration of these kinds of findings and suggestions for improvements should be included in the next SARex exercise, in order to process these issues further. Industry, researchers, academic institutions and other participants can make important contributions to solve these questions, along with the public (tourists, society, etc.), and everyone will benefit from the development of such equipment.

### C.18.5 Findings and suggestions for the next exercise

There is a need to redesign and develop different equipment connected with rescue operations in the Arctic Sea. Based on our observations, we have collected some suggestions that may be included in the next SARex or may be put in a “finding list” for further development. For instance, we saw that:

- A more systematic registration of the findings and suggestions for improvements should be included, in order to process these issues further.
- A systematic procedure on how to follow up the findings should be generated, in order to more effectively close the gap between findings and necessary solutions.
- The development of new – or the redesign of existing – technical equipment for handling wounded people (e.g. stretcher systems, sliding systems) could be helpful in the SAR operations.
- The development of new technologies and communication systems, such as different apps for mobile phones to more easily exchange information in SAR operations, would be good.
- New types of lightweight shelters and other protective equipment, and new, better insulating products/materials could increase the number of survivals in SAR operations and would be helpful.

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- Developing functional prototypes of new improved products to use in rescue operations and test them in a new SARex “real-life” exercise would increase the success of SAR operations.

We think that using a systematic process to register findings will bring new ideas forward. In this way, identified findings, challenges and problems should be made available to the public through an open website. Then, anyone can give input to different problems and challenges, and anyone can “take” one of these identified problems and work with it in different projects. The ongoing process and suggested solutions must be registered in order for them to be developed into real-life solutions and products that can be tested in the next SARex exercise. Such a systematic process will contribute to achieving successful rescue operations in the Arctic Sea in the future, since this will give new improved solutions. Many of these kinds of projects may solve important gaps between necessary solutions and existing solutions; closing this gap is important for both society and individuals. Many of these gaps are “non-commercial” questions. This means that few commercial companies will make an effort to develop solutions to the problems, since there is little prospect of earning a lot of money (there is a limited market that will buy these products). Naturally, the universities may be interested in R&D in such identified problems, since they have the possibility to perform R&D activities connected to such non-commercial problems. Also, there will be no distortion of competition connected to these product-development projects because of the non-commercial issues.

#### C.18.6 Some final remarks from Maritimt Forum Nord

Every year many people move to and from Svalbard, and the members of the Longyearbyen Red Cross will therefore continually change: more so than in equivalent groups on the mainland. Therefore, it is especially important that everyone receives necessary and relevant training in different situations and that they get to know each other well, since these kinds of rescue operations require a strong sense of trust in each other. Hence, we understand that, for the people living in and visiting Svalbard, exercises like SARex are particularly important, in order to be as well prepared as possible should different types of disasters or unwanted accidents occur. In addition, the increase in tourism and other activities in connection with Svalbard will increase the risk of experiencing such unwanted accidents.

SARex 3 is the third search and rescue exercise involving Svalbard. Maritimt Forum Nord (in the north of Norway) greatly appreciates the contribution and efforts of the Norwegian Coast Guard (NORCG) in the SARex expeditions. We especially thank the leader of the Coast Guard Competence Center, Commander S.G. Endre Barane, and Captain (N) Steve Olsen (Deputy Commander in the Norwegian Coast Guard) for their involvement and participation in SARex exercises, along with the rest of the staff and crew in NORCG.

The Norwegian Coast Guard has a lot of experience, and their genuine interest in also including participants in e.g. SARex, and providing training and transfer of competence, is highly appreciated and of great importance for all those of us who are exposed to the Norwegian harsh, but beautiful, environment in the Arctic Sea. For more information concerning The Norwegian Coast Guard and Maritimt Forum Nord, see [8] and [9], respectively. We also thank all the other participants, for their input in the exercise, and the driving forces: Professor Emeritus Ove Tobias Gudmestad and Senior Researcher Knut Espen Solberg for their efforts and their willingness to contribute their skills and knowledge. Finally, we thank Steve Olsen for arranging the special “late arrivers” trip, which made it possible for Maritimt Forum Nord, this year represented by Annette Meidell, to participate.



Figure C.18.13. Steve Olsen (left) and Endre Barane, Commanding Officer of KV "Svalbard" in the SARex 3 exercise. Photo: Annette Meidell.

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